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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/432,112	11/02/1999	TAKASHI TSUDA	837.1212/JDH	9637

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STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER	
JUBA JR, JOHN	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 06/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/432,112	TSUDA ET AL.	
	Examiner	Art Unit	
	John Juba, Jr.	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,15,63 and 64* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,63 and 64* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 November 1999* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 10, 2005 has been entered.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the structure of the "determining" and a "determining unit" must be shown or the feature(s) canceled from the claim (claim 15, line 14). No new matter should be entered. As further set forth below, the introduction of a "determining unit" in itself appears to be new matter. However, to the extent that the new matter rejection below may be overcome, then the drawings are deficient as to illustration of the subject matter now claimed.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet,

and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 15 is objected to because of the following informalities. Appropriate correction is required:

There is no antecedent basis for "said determining unit" recited in line 14 of claim 15.

There is no punctuation at the end of line 6 in claim 15.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 15 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one

skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As amended, claim 15 recites "a determining unit determining whether a specific one of the optical fiber types exists in the optical transmission line". However, there appears to be no disclosure in the original specification, claims, or drawings of such a "determining unit". As such, the recitation of a "determining unit" constitutes new matter.

Claim 15 is further rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. There is no disclosure of what manner of measurement, supervisory signaling, or data input is contemplated as facilitating the determination, by a "unit", rather than by personnel, that a certain fiber type is present. For example, are means to be provided for measuring the index distribution across a fiber cross-section? And, if so, how would such measuring means be interposed in the transmission line, without completely disrupting communications? Alternatively, if the "unit" is to make a determination based upon dispersion at some point in the transmission line, what means would be required to advise the "unit" of the remaining parameters necessary to draw a conclusion as to fiber type?

Claims 1 – 3, 15, 63, and 64 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is ambiguous at (f) as to whether the step of providing a dispersion compensator at each of the optical transmitter, the optical receiver, and the optical amplifier is performed according to all of the recited criteria (*i.e.,* the connections and dispersion at all the locations), or whether the a dispersion compensator is provided in each location only according to the local fiber type and dispersion (*i.e.,* the optical transmitter only according to the optical fiber type immediately downstream of the transmitter, and the immediate downstream dispersion; the dispersion compensator is provided in the optical receiver only according to the upstream fiber type and upstream dispersion; and the dispersion compensator is provided in the amplifier according to the upstream and downstream dispersion and upstream fiber type). Claims 2 – 3, 63, and 64 are rejected as inheriting the same ambiguity through their dependency from claim 1.

In much the same way, claim 15 is ambiguous as to whether the dispersion compensator is provided at a given location according to the fiber type and dispersion at that location only, or according to all of the variables recited.

Claim 64 is further rejected as being ambiguous as to which of the "first" and "second" recited optical amplifiers is connected to the fiber types in the manner recited in the last clause.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 – 3, 15, 63, and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hidenori Taga, et al (*IEEE J. Quantum Electr.*), in view of Sato, et al (U.S. Patent number 6,229,631) and further in view of A. Bertaina, et al (*ECOC '98*). Referring to Figure 4 and the associated text, Taga, et al model a system for optical transmission adopting dispersion compensation, comprising an optical fiber transmission line composed of a plurality of segments each having a length falling within a predetermined range, said plurality of segments including a plurality of fiber types (SMF and NZ-DSF), and an optical fiber having a specific one (NZ-DSF) being applied to at least one of said plurality of segments; an optical transmitter supplying an optical signal to said optical fiber transmission line from one end thereof; and optical receiver receiving said optical signal from the other end of said fiber transmission line; optical amplifiers provided between adjacent ones of said segments; and at least one dispersion compensator provided in one of the transmitter, the amplifiers, or the receiver (in this case, provided in the receiver). in light of the dispersion at various points in the transmission lines, Taga, et al identify the receiver as an appropriate point for the compensator. Thus, Taga, et al suggest the invention substantially as claimed. However, Taga, et al do not disclose dispersions selected from stepwise varying

dispersions, and do not expressly refer to the connected fiber type in determining the location of the dispersion compensator.

In the same field of endeavor, Sato, et al disclose an embodiment (Figs. 21 & 22; Col. 17) comprising multiple fiber segments and step variable dispersion compensators in the amplifiers and receiver, the compensators being under control of a "simulator" having *a priori* knowledge of the fiber types and fiber lengths, wherein SMF *or* DSF are disclosed as generally suitable for the fiber segments (Col. 18, lines 57+). Sato, et al teach that since dispersions vary from fiber to fiber, provision of the dispersion compensators with a plurality of stepwise varying dispersions permits an optimum correction value to be inserted at each location.

It would have been obvious to one of ordinary skill to provide the dispersion compensators of Taga, et al with a plurality of stepwise varying dispersion values, in the interest of permitting the optimum dispersion value to be inserted in accordance with the fiber segments actually installed in a real-world setting, as suggested by Sato, et al. Thus, Taga, et al and Sato, et al suggest the invention substantially as claimed. However, these references do not disclose providing a dispersion compensator in each of an optical transmitter, an optical receiver, and an optical amplifier in accordance with whether or not a particular optical fiber type is connected at that location.

In the same field of endeavor, Bertaina, et al simulate a variety of optical transmission links having a plurality of fiber segments. Their generalized approach is to provide a dispersion compensator at each of a transmitter, a receiver, and an optical amplifier. Referring to Figures 1c, 1d, and 1e, Bertaina, et al teach that when the

segments of the transmission line are all of the same fiber type, dispersion compensation is needed at each of the transmitter, receiver, and optical amplifiers. However, referring to Figure 1f, Bertaina, et al teach that in "dispersion managed" transmission lines having a combination of two fiber types (*e.g.,* NZDSF+ and NZDSF-), a dispersion compensator can be omitted in each of the optical amplifiers. Thus, whereas Sato, et al teach selecting specific values for the dispersion compensators in accordance with upstream and downstream dispersion, and with knowledge of the specific fiber type installed at each location, Bertaina, et al fairly teach provision of a dispersion compensator in specific locations and omission of a dispersion compensator according to the type of fibers connected and according to the dispersion.

In optical transmission adopting dispersion compensation according to the methods suggested by Taga, et al and Sato, et al, it would have been obvious to one of ordinary skill to provide a step-wise varying dispersion compensator in each of the transmitter, the optical receiver, and an optical amplifier only in accordance with the fiber type and local dispersion, in the interest of eliminating a dispersion compensator where it is not needed, as suggested by Bertaina, et al. It has been held that elimination of an element and its corresponding function where the function is not needed is an obvious expedient. In the instant case, one of ordinary skill would have appreciated that each step-compensator eliminated from a network represents a cost saving, as well as a saving in supervisory complexity and overhead.

With regard to claims 3, 63, and 64, Taga, et al disclose the case where a dispersion shifted fiber is connected at the transmitter output and no dispersion

compensator is provided in the transmitter. Taga, et al also disclose a plurality of optical amplifiers (every ninth repeater) wherein the segment immediately upstream is the dispersion shifted type and the segment immediately downstream is single-mode fiber type, and disclose a plurality of amplifiers (every tenth repeater) wherein the segment immediately upstream is a single-mode type fiber and the segment immediately downstream is a dispersion shifted type. Taga, et al do not disclose a dispersion compensator in any of these amplifiers. However, Sato, et al fairly teach that the dispersion of the fiber segments connected in a real-world environment are subject to change. Thus, it would have been obvious to provide a dispersion compensator in specific amplifiers where the fiber segment actually connected is not of a dispersion that provides optimum dispersion management, as suggested by Sato, et al.

With regard to claim 15, Sato, et al fairly suggest provision of a "determining" or "determining unit" *vis á vis* their "simulator".

Response to Amendment

Applicants' amendment to claim 15 is not sufficient in overcoming the previous drawing objection. To the extent that "a determining" is to be construed as part of the claimed structure, the structure of the "determining" must be shown. Further, there is still a recitation of a "determining unit", albeit without proper antecedent basis.

Applicants' amendment of claim 1 is sufficient in overcoming the previous objection to claims 1 – 3, 63, and 64.

For the reasons set forth above, Applicants' amendment of claim 15 is not sufficient in overcoming the rejection thereof under 35 U.S.C. §112, first paragraph for introducing new matter, and for a lack of enabling disclosure.

For the reasons set forth by Applicants in their response, the amendment of claims 1 and 15 is sufficient in overcoming the previous rejection of claims 1 – 3, 15, 63, and 64 under §103(a) as being unpatentable over Chraplyvy, et al (U.S. Patent number 5,559,920), in view of Delavaux, et al (U.S. Patent number 5,608,562) and Kosaka, et al (U.S. Patent number 6,195,480). The examiner agrees that the method of claim 1 is of such scope as to *permit* omission of a dispersion compensator in the optical transmitter, the optical receiver, or the optical amplifier by always using the specific fiber type in at least one of a plurality of segments. However, the claim does not expressly recite omitting a dispersion compensator at a location. Rather, the claim recites providing a dispersion compensator at each of the locations according not only to whether or not the specific fiber type is connected at that location, but also according to the dispersion measured at that location. Thus, the claim is of such scope as to include the case wherein a dispersion compensator is connected at all of the recited locations, despite the presence of the specific fiber type at least at one location.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Abbott, et al (U.S. Patent Appl. Pub. No. 2001/0003549 A1) disclose a dispersion compensator providing in a fiber transmission path made of first and second fiber types.

Fee (U.S. Patent number 6,266,170) discloses a method of dispersion compensation adapted to systems in which the fiber types are subject to change, one method including providing step dispersion compensators at a plurality of locations in the network and loading an initial value of dispersion into less than all of the compensator locations, the group of compensators so loaded being selected in accordance with the fiber type connected thereto, and further including the step of determining the dispersion at a variety of locations in the network.

M.E. Marhic, et al (*IEEE Photon. Tech. Lett.*) disclose a periodically amplified fiber transmission channel and teach that it may be desirable to omit dispersion compensators at specific locations.

M. Newhouse, et al (*OFC '97*) teach that appropriate placement of dispersion compensators in a fiber transmission channel is a function of fiber type.

I. Morita, et al (*ECOC '96*) disclose a fiber transmission channel employing segments of DSF and segments of SMF and teach inserting dispersion compensators at specific amplifier locations.

Akihide Sano, et al (*ECOC '96*) disclose a fiber transmission channel comprising spans of three fiber types without amplifiers therebetween, and disclose a receiver having a step-variable dispersion compensator.

F. Neddam, et al (*ECOC '98*) disclose a fiber transmission channel having a SMF fiber span and multiple DSF fiber spans, and teach insertion of dispersion compensators in a regenerative repeater.

N.S. Bergano, et al (*IEEE J. Lightwave Techn.*) disclose a fiber transmission channel including DSF spans and a SMF span, the channel output being passed to a receiver having a dispersion compensator therein.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (571) 272-2314. The examiner can normally be reached on Mon.-Fri. 9 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Drew Dunn whose number is (571) 272-2312 and who can be reached on Mon.- Thu., 9 – 5.

The centralized fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for *all* communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2800.

JOHN JUBA, JR.
PRIMARY EXAMINER
Art Unit 2872

June 15, 2005